THE CLAIMS

1. (Currently amended) A non-linear passive transponder for use in a wireless electromagnetic tracking system for providing location information for an object in a medical environment, said transponder including:

a coil for transmitting a response signal in response to an excitation signal, wherein a position and orientation of said transponder are determined based at least in part on said response signal;

a core around which said coil is wound to contain the turns of said coil, wherein the two ends of said coil are connected to two terminals attached to said core; ~~and~~

a capacitor connected across the two terminals in parallel with said coil;

a ~~rectifying device~~ diode connected across the two terminals in parallel with said coil to introduce non-linear characteristics into said response signal to distinguish said response signal from said excitation signal and to calculate the position and orientation from said non-linear characteristics of said response signal, wherein said non-linear characteristics introduce at least one additional frequency in said response signal that is not found in said excitation signal, and wherein said response signal transmits data based on fluctuations in said response signal; and

a switch connected in series with said diode or said capacitor, wherein said switch selectively connects and disconnects said diode and/or said capacitor with respect to said two terminals in order to alter a waveform of said response signal.

2. (Canceled)

3. (Canceled)

4. (Canceled)

5. (Canceled)

6. (Currently amended) The transponder of claim [[4]] 1 wherein operation of said switch is controlled.

7-12. (Canceled)

13. (Currently amended) A non-linear passive transponder for use in a wireless electromagnetic tracking system for providing location information for an object in a medical environment, said transponder consisting of:

a core for transmitting a response signal, wherein a position and orientation of said transponder are determined based at least in part on said response signal;

a coil wrapped around said core to produce said response signal in response to an excitation signal received at said transponder, wherein the two ends of said coil are connected to two terminals attached to said core;

a diode connected in parallel across the two terminals to said coil to introduce non-linear characteristics into said response signal to distinguish said response signal from said excitation signal and to allow said position and orientation of said transponder to be determined based at least in part on said response signal; ~~and~~

a capacitor connected in parallel across the two terminals to said coil, said capacitor varying voltage and current values in said response signal based on variations in the capacitance of said capacitor, and

a switch connected in series with said diode or said capacitor, wherein said switch selectively connects and disconnects said diode and/or said capacitor with respect to said two terminals in order to alter a waveform of said response signal,

wherein said non-linear characteristics introduce at least one additional frequency in said response signal that is not found in said excitation signal and said capacitance introduces waveform characteristics allowing said transponder to be distinguished from other transponders, and wherein said response signal transmits data based on fluctuations in said response signal.

14-20. (Canceled)

21. (Currently amended) A method for transmitting data in a wireless electromagnetic tracking system comprising:

transmitting a signal from a transponder using a ~~rectifying device~~ diode and a capacitor that are both connected in parallel ~~with~~ across two terminals connected to a coil, wherein said signal contains at least a first frequency and a second frequency, wherein a position and orientation of said transponder are determined based at least in part on said signal;

varying at least said second frequency using said ~~rectifying device~~ diode to produce a variation in at least said second frequency;

varying a waveform characteristic of at least said second frequency using said capacitor to produce a variation in at least said second frequency; and

encoding data in said signal based upon said variation in at least said second frequency.

22-27. (Canceled)

28. (Currently amended) A transponder for use in a wireless electromagnetic tracking system for providing location information for an object in a medical environment, said transponder including:

a coil for transmitting a response signal in response to an excitation signal, wherein a position and orientation of said transponder are determined based at least in part on said response signal; ~~and~~

a core around which said coil is wound to contain the turns of said coil, wherein two ends of said coil are connected to two terminals attached to said core;

a capacitor connected across the two terminals in parallel with said coil;

a diode connected across the two terminals in parallel with said coil; and

a switching device connected in parallel with said coil to alter non-linear and waveform characteristics of said response signal to distinguish said response signal from said excitation signal and used to distinguish said transponder from other transponders and to determine said position and orientation of said transponder based at least in part on said response signal,

wherein said response signal transmits data based on said non-linear and waveform characteristics altered in said response signal.

29. (Original) The transponder of claim 28 wherein said switching device is a switching diode.

30. (Original) The transponder of claim 28 wherein said switching device is a synchronous rectifier.

31. (Original) The transponder of claim 28 wherein said switching device is a transistor.

32. (Original) The transponder of claim 28 further including a capacitor connected in parallel with said coil.

33. (Original) The transponder of claim 32 further including a switch connected in series with said capacitor.

34. (Previously presented) The transponder of claim 33 wherein operation of said switch is controlled.

35. (Previously presented) The transponder of claim 1, wherein at least one position and at least one orientation of said transponder are determined.

36. (Previously presented) The transponder of claim 1, wherein at least one of a position and orientation of said transponder are determined in relation to a patient anatomy.

37. (Previously Presented) The transponder of claim 36, wherein said transponder operates in conjunction with a medical device within a patient anatomy.

38-41. (Canceled)

42. (Previously presented) The method of claim 21, wherein said rectifying device comprises at least one of a diode, a transistor, and a synchronous rectifier.